



**Massachusetts Bay
Transportation Authority**

Transit Asset Management Program

Status Update

March 12, 2018



MBTA Asset Management Program Goals

MBTA Asset Management Program provides policies, processes, and systems to:

1. Meet or exceed service delivery goals by achieving and maintaining a **state of good repair** for all MBTA assets
2. Effectively identify, prioritize, and manage **risk**, including safety, reliability, financial, and performance risk.
3. Enable transparent, consistent, and data-driven decision making for **investment prioritization** across asset classes
4. Continue and sustain the MBTA's **fiscal discipline** by optimizing available resources through lifecycle management, reliability-centered maintenance, business process improvements, and other best practices
5. Achieve **compliance** with Federal and State requirements and serve as a leader among peer agencies



Why do we need Asset Management at the MBTA?

- Better asset custodianship (Risk based)
- Financial stewardship
- Investment prioritization
- FTA, NTD, MassDOT deliverables

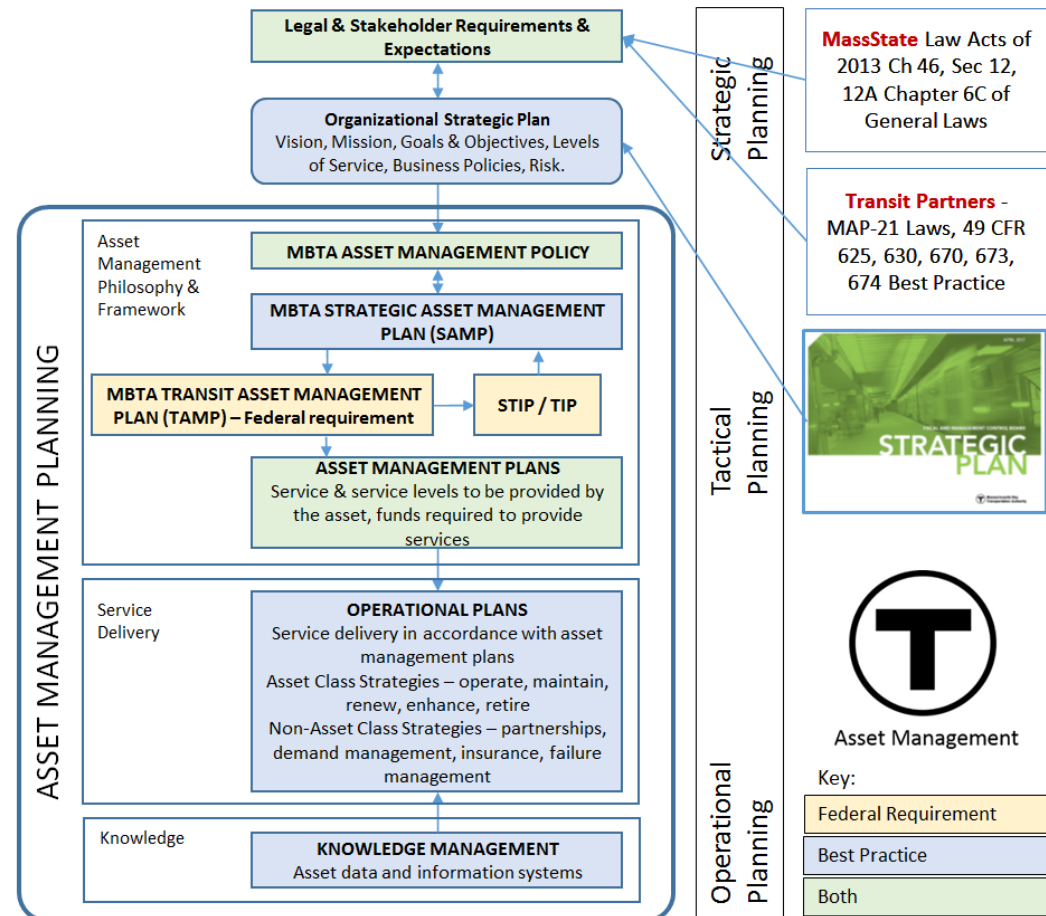
Key Federal Deliverables

1. Asset Inventory Module
2. FY19 Performance Targets (FY18 Completed), starts when FY19 CIP is issued
3. Transit Asset Management Plan



ALL DUE October 1st 2018

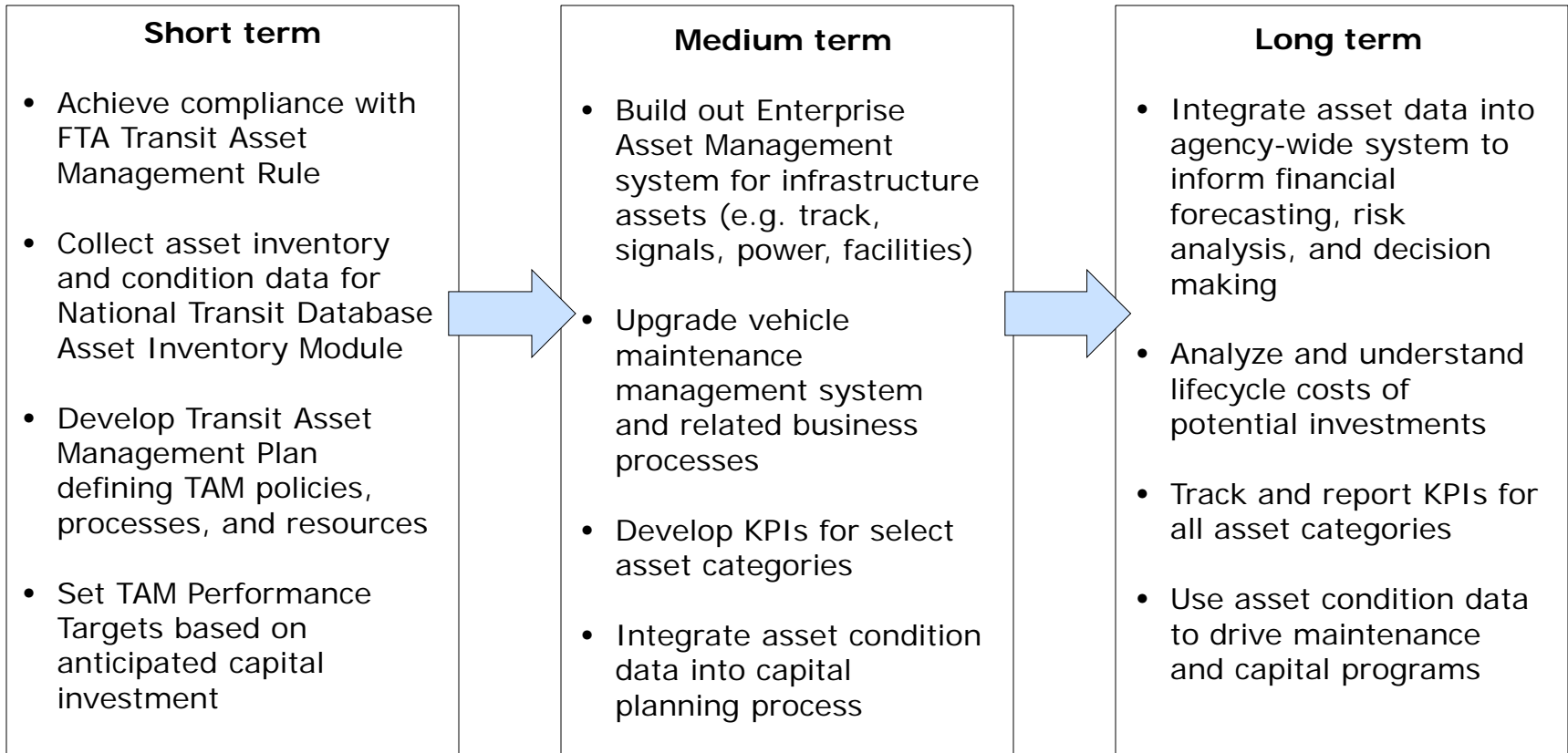
Asset Management System



Asset Management



Phased implementation of MBTA Asset Management Program





Implementation of FTA Transit Asset Management (TAM) Final Rule



Scope

1. Report Information for all assets owned and/or managed by MBTA and used to provide public transportation services to the FTA, NTD and MassDOT.
2. Report performance targets to FTA, MPO
3. Develop and submit TAM Plan & AIM

Objectives

- Identify existing and proposed levels of service to be achieved
- Identify Life Cycle Management needs by asset class
- Assess resources required to support safe and reliable service delivery and bring assets into a SGR
- Document key processes, organization, and tools for effective Asset Management
- Establish action plans for the improving approach to asset management activities

Revenue Vehicles

- Buses
- Railcars
- Other Passenger Vehicles (e.g., THE RIDE, Ferry)

Equipment

- Construction
- Maintenance
- Service Vehicles

Infrastructure

- Systems
- Fixed Guideway
- Power
- Structures (e.g., Bridges & Tunnels)

Facilities

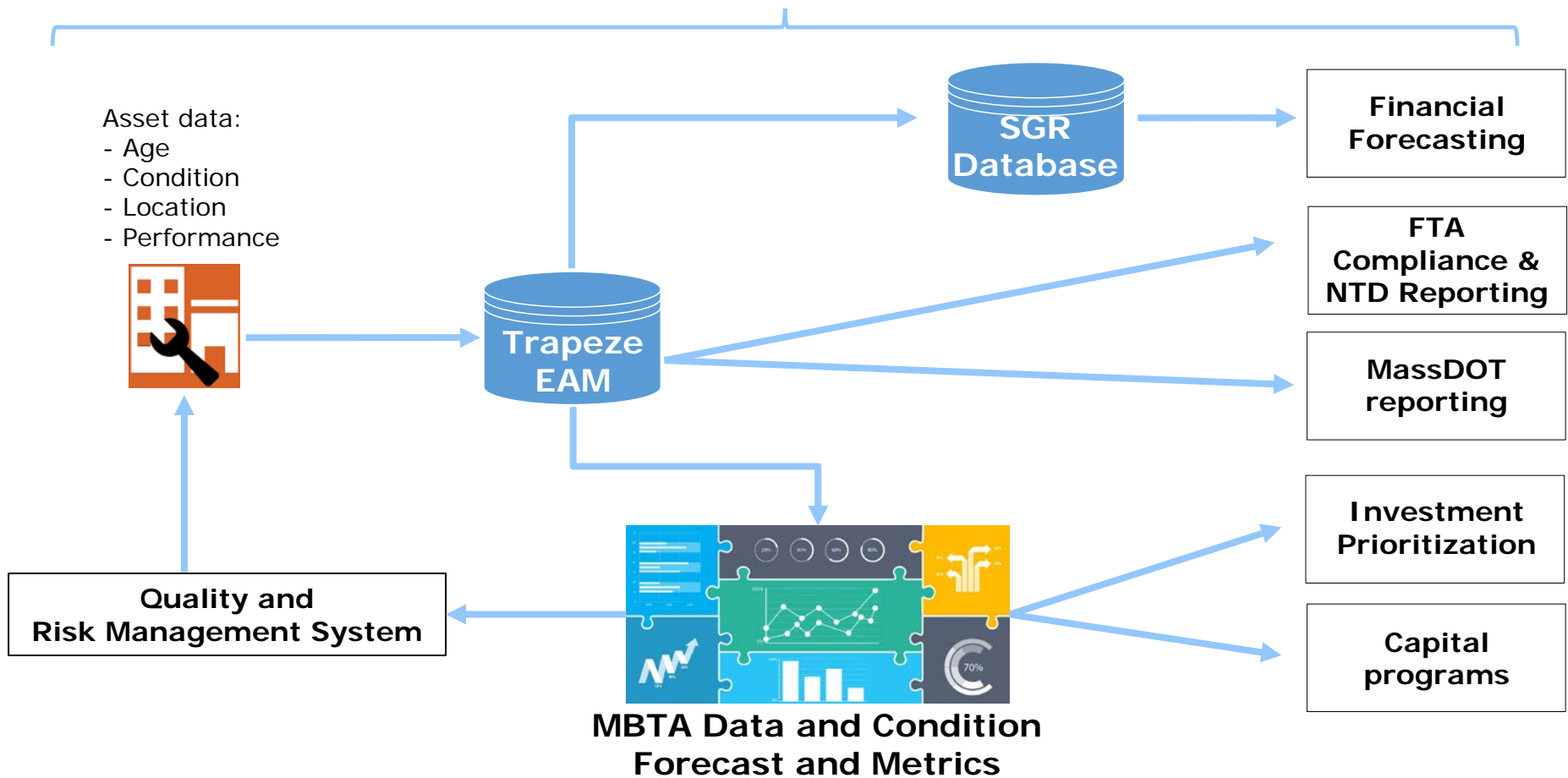
- Passenger Facilities (e.g., Stations)
- Maintenance Facilities
- Parking Facilities
- Administrative Buildings

Adapted from FTA Asset Management Guide - Asset Class Level (2016)



Data Process Flow

Proposed Management System for Existing Assets





MBTA Asset Management Initiatives: State of Good Repair Database

Definition: The SGR Database is a financial forecasting tool used to calculate future backlog, condition, and capital funding needs

- Input/Output

- Inputs: Inventory list, age, condition, performance, renewal values, decay curves, etc.
- Outputs: Backlog size, scenario-based forecasting of backlog and condition

Asset inventory and condition data collected and validated in support of the NTD Asset Inventory Module will provide updated inputs for the SGR database



FY19 Operating Budget Support

Asset Management & Quality Assurance Personnel

- Request of Staff requested with Asset Management, Quality Assurance designation
- Personnel will work across asset categories
 - Oversee the configuration and change control of new and existing assets
 - Ensure Asset Information Standards are adhered to for new and existing assets
 - Conducts data analytics
- In-source Technical Expertise
- Develops and implements Risk Management Processes for infrastructure assets
- Helps inform the CIP process with validated data



MBTA Asset Management Initiatives: FY18 Performance Targets



Asset Category	Measure	Measure Type
Equipment	Percentage of vehicles that have met or exceeded their Useful Life Benchmark	Age-based
Rolling Stock	Percentage of revenue vehicles that have met or exceeded their Useful Life Benchmark	Age-based
Facilities	Percentage of assets with condition rating below 3.0 on FTA TERM scale	Condition-based
Infrastructure [Fixed Guideway]	Percentage of track segments with performance [speed] restrictions, by mode	Performance-based

For Discussion & Policy Purposes Only

Timeline

2017

2018

Oct > Nov > Dec > Jan > Feb > Mar > Apr > May > Jun > Jul > Aug > Sep > Oct

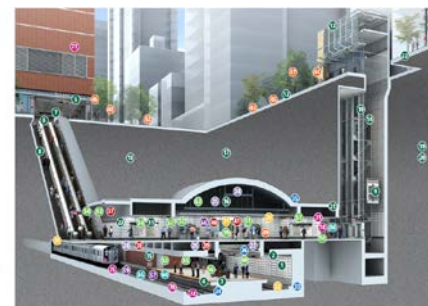
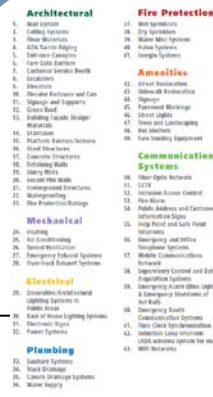
Phase 2 – Asset Inventory Data Entry/Troubleshooting (16 weeks)

Phase 3 – Data Validation/Condition Assessment/FY19 Performance Targets (16 weeks)

Phase 4 – QA/QC & Final Review (8 weeks)

Phase 5 – Data Entry into the National Transit Database (3 weeks)

Today



Signal System

- 67. Component sub-assemblies
- 68. Wayside Signal Display Box
- 69. Switch Circuit Assembly

Traction Power

- 79. Tracked Infrastructure
- 79. SCADA Train Control System
- 77. Third Rail (and third rail material)
- 72. Substation
- 74. Power Control Room
- 75. Regenerative Braking Equipment/Kit





MBTA Asset Management Initiatives: NTD Asset Inventory Module

Scope Example: Assets in a Typical Transit Station

Architectural

1. Wall System
2. Ceiling Systems
3. Floor Materials
4. ADA Tactile Edging
5. Entrance Canopies
6. Fare Gate Barriers
7. Customer Service Booth
8. Escalators
9. Elevators
10. Elevator Enclosure and Cars
11. Signage and Supports
12. Green Roof
13. Building Façade Design/ Materials
14. Staircases
15. Platform Barriers/Screens
16. Steel Structures
17. Concrete Structures
18. Retaining Walls
19. Slurry Walls
20. Secant Pile Walls
21. Underground Structures
22. Waterproofing
23. Fire Protection/Ratings

Mechanical

24. Heating
25. Air Conditioning
26. Tunnel Ventilation
27. Emergency Exhaust Systems
28. Over-track Exhaust Systems

Electrical

29. Decorative/Architectural Lighting Systems in Public Areas
30. Back of House Lighting Systems
31. Electronic Signs
32. Power Systems

Plumbing

33. Sanitary Systems
34. Track Drainage
35. Cavern Drainage Systems
36. Water Supply

Fire Protection

37. Wet Sprinklers
38. Dry Sprinklers
39. Water Mist Systems
40. Halon Systems
41. Inergen Systems

Amenities

42. Street Restoration
43. Sidewalk Restoration
44. Signage
45. Pavement Markings
46. Street Lights
47. Trees and Landscaping
48. Bus Shelters
49. Fare Vending Equipment

Communication Systems

50. Fiber Optic Network
51. CCTV
52. Intrusion Access Control
53. Fire Alarm
54. Public Address and Customer Information Signs
55. Help Point and Safe Point Intercoms
56. Emergency and Office Telephone Systems
57. Mobile Communications Network
58. Supervisory Control and Data Acquisition Systems
59. Emergency Alarm (Blue Light & Emergency Shutdown of 3rd Rail)
60. Emergency Booth Communication Systems
61. Time Clock Synchronization
62. Induction Loop Intercom (ADA wireless system for deaf)
63. WIFI Networks

Track

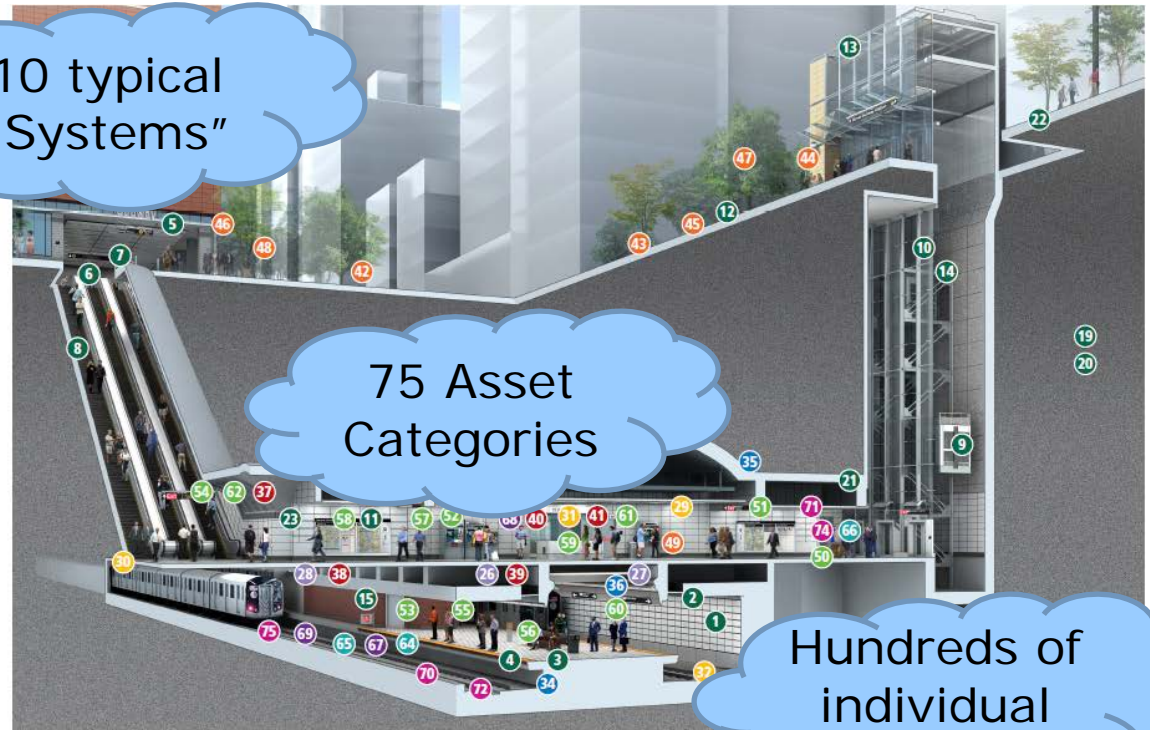
64. Track Fixation (attachments)
65. Rail
66. Rail Switches and Crossovers

Signal Systems

67. Component Infrastructure
68. Wayside Signal Display Boxes
69. Track Circuit Hardware

Traction Power

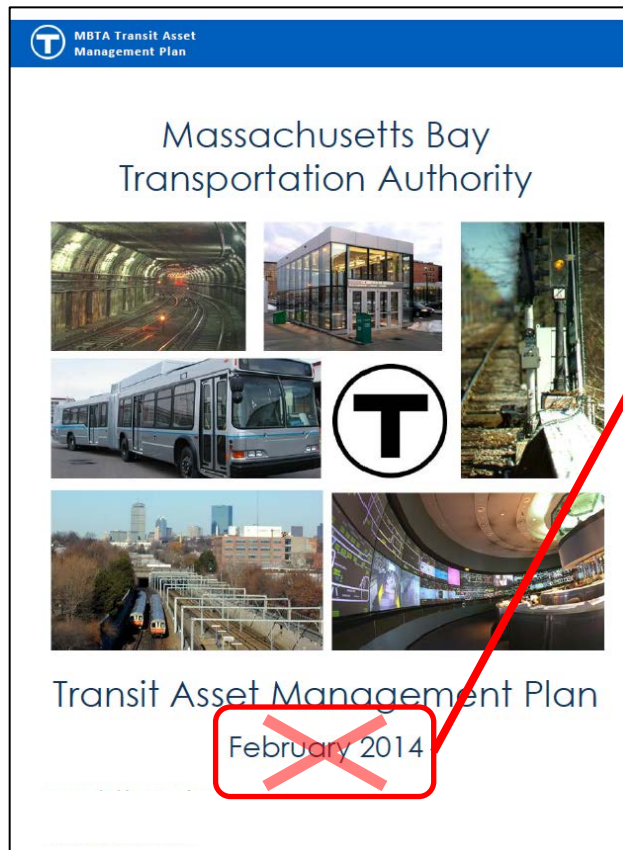
70. Trackbed Infrastructure
71. SCADA Train Control System
72. Third Rail (and third rail material)
73. Substation
74. Power Control Room
75. Regenerative Braking Equipped Railcar



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MBTA Asset Management Initiatives: Transit Asset Management Plan



2018 update

- MBTA Strategic Plan alignment
- New Leadership vision and structure
- Updated Investment Strategy
- Benchmarks against other transits
- Updated inventory of record
- Establishment of New KPIs
- New (more refined) FTA requirements
- Process improvement opportunity



APPENDIX



MBTA Asset Management Initiatives: FY18 Performance Targets



MBTA Performance Targets for FY18

August 2017



Massachusetts Bay
Transportation Authority

FINAL

10/31/17 Update



MBTA Asset Management Initiatives: FY18 Performance Targets

TAM Performance Measures

Background

- In 2012, MAP-21 mandated FTA to develop a rule establishing a strategic and systematic process of operating, maintaining, and improving public capital assets effectively through their entire life cycle.
- The TAM Final Rule 49 USC 625 became effective Oct. 1, 2016 and established four performance measures. The performance management requirements outlined in 49 USC 625 Subpart D are a minimum standard for transit operators.

Performance Measures

1. **Rolling Stock:** The percentage of revenue vehicles that meet or exceed the useful life benchmark (ULB).
2. **Equipment:** The percentage of non-revenue service vehicles that meet or exceed the ULB.
3. **Facilities:** The percentage of facilities that are rated less than 3.0 on the Transit Economic Requirements Model (TERM) Scale.
4. **Infrastructure:** The percentage of track segments (by mode) that have performance restrictions. Track segments are measured to the nearest 0.01 of a mile.

Submission Requirements

- Optional Report Year 2017
- Mandatory Report Year 2018

MBTA Coordinating Team

- Satyen Patel, Director of Asset Management
- Victor Rivas, Deputy Director of Capital Programs Reporting, Metrics & Strategic Initiatives



MBTA Asset Management Initiatives: FY18 Performance Targets

Performance Targets Included

- ✓ Rolling Stock
 - Revenue Vehicles By Mode
- ✓ Facilities
 - Stations
 - Parking
 - Maintenance and Administrative Buildings
- ✓ Infrastructure
 - Tracks
- ☐ Equipment
 - ☐ Non-revenue support-service and maintenance vehicles (baseline only)



MBTA Asset Management Initiatives: FY18 Performance Targets

Task Tracking Table

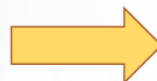
#	Asset Type	Staff Responsible	Metric	Performance Measure	Baseline (FY17)	Target (FY18)
Revenue Vehicles						
1	Heavy Rail	Bill Wolfgang	Age	% of units ≥ ULB	✓	✓
2	Light Rail	Bill Wolfgang, Steve Hicks	Age	% of units ≥ ULB	✓	✓
3	Bus	Bill Wolfgang	Age	% of units ≥ ULB	✓	✓
4	Commuter Rail Locomotives	Steve Adkins, Leanna Green	Age	% of units ≥ ULB	✓	✓
5	Commuter Rail Coaches	Steve Adkins, Leanna Green	Age	% of units ≥ ULB	✓	✓
6	Ferry	Bill Wolfgang, Mimi Lannin	Age	% of units ≥ ULB	✓	✓
7	The RIDE	Mike Hulak, Eric Waaramaa	Age	% of units ≥ ULB	✓	✓
Facilities						
8	Stations	Satyen Patel, E&M Facilities Team	Condition	% of assets < 3.0 in TERM Scale	✓	✓
9	Parking	Satyen Patel, E&M Facilities Team	Condition	% of assets < 3.0 in TERM Scale	✓	✓
10	Facilities	Satyen Patel, E&M Facilities Team	Condition	% of assets < 3.0 in TERM Scale	✓	✓
11	Commuter Rail Stations	Satyen Patel, Manny Vieira, Andrew Gildea	Condition	% of assets < 3.0 in TERM Scale	✓	✓
12	Commuter Rail Parking	Satyen Patel, Manny Vieira, Andrew Gildea	Condition	% of assets < 3.0 in TERM Scale	✓	✓
13	Commuter Rail Facilities	Satyen Patel, Manny Vieira, Andrew Gildea	Condition	% of assets < 3.0 in TERM Scale	✓	✓
Infrastructure						
14	Heavy Rail Tracks	Satyen Patel, E&M Track Team	Performance	% of track with speed restrictions	✓	✓
15	Light Rail Tracks	Satyen Patel, E&M Track Team	Performance	% of track with speed restrictions	✓	✓
16	Commuter Rail Tracks	Satyen Patel, Corey Lynch, Kevin Biggins	Performance	% of track with speed restrictions	✓	✓
Non-Revenue Vehicles						
17	Transit	Satyen Patel (data analysis), Bill Griffiths (capital replacement/renewal information)	Age	% of units ≥ ULB	✓	✓
18	Commuter Rail	Satyen Patel, Jim Duncan	Age	% of units ≥ ULB	✓	✓



MBTA Asset Management Initiatives: FY18 Performance Targets

Rolling Stock

- Bus
- Heavy Rail
- Light Rail
- Commuter Rail Locomotives
- Commuter Rail Coaches
- The RIDE
- Ferry



Assets: <i>Only those for which agency has direct capital responsibility</i>	Performance Measure
Equipment: Non-revenue support-service and maintenance vehicles	Percentage of non-revenue vehicles met or exceeded Useful Life Benchmark
Rolling Stock: Revenue vehicles by mode	Percentage of revenue vehicles met or exceeded Useful Life Benchmark
Infrastructure: Only rail fixed-guideway, track, signals and systems	Percentage of track segments with performance restrictions
Facilities: Maintenance and administrative facilities; and passenger stations (buildings) and parking facilities	Percentage of assets with condition rating below 3.0 on FTA TERM Scale

Useful Life Benchmark

The expected lifecycle of a capital asset for a particular Transit Provider's operating environment, or the acceptable period of use in service for a particular Transit Provider's operating environment

Note: See Rolling Stock ULB values under Appendix 1



MBTA Asset Management Initiatives: FY18 Performance Targets

Rolling Stock Bus

Bus						Age		Count on June 30th		
Type	Make	Model	Status	Model Year	ULB	2017	2018	2017	2018	
Articulated (60 ft)	Neoplan	DMA LF	In Service	2004	14	13	14	32	32	
Articulated (60 ft)	New Flyer	DE60LFR	In Service	2010	14	7	8	25	25	
Articulated (60 ft)	New Flyer	XDE60	In Service	2016	14	1	2	44	44	
Standard (40 ft)	Neoplan	AN440 LF ECD	In Service	2004	14	13	14	192	192	
Standard (40 ft)	NABI	40LFW	Retirement Ongoing	2004	14	13		50	0	
Standard (40 ft)	New Flyer	D40LF (Base)	In Service	2006	14	11	12	155	155	
Standard (40 ft)	New Flyer	D40LF (Option)	In Service	2008	14	9	10	155	155	
Standard (40 ft)	El Dorado National	H-40	In Service (Demo)	2014	14	3	4	1	1	
Standard (40 ft)	New Flyer	XDE40	In Service	2015	14	2	3	60	60	
Standard (40 ft)	New Flyer	XDE40	Delivery Ongoing (156 total)	2016	14	1	2	130	156	
Standard (40 ft)	New Flyer	XN40	Delivery Ongoing (175 total)	2016	14	1	2	155	175	
Trolley Bus	Neoplan	AN440LF/ETB	In Service	2004	13	13	14	28	28	
<div>Legend</div> <div><div></div>FY18 target</div>								# of units	1027	1023
								# units ≥ ULB	28	252
								% ≥ ULB	3%	25%

Legend

- FY18 target
- Met or exceeded ULB
- Counted as having met or exceeded ULB

The MBTA is currently funding a number of bus maintenance programs to ensure the availability of revenue vehicles for the provision of safe and reliable service.



MBTA Asset Management Initiatives: FY18 Performance Targets

Rolling Stock

Light Rail (Green Line & Mattapan Trolley Service)

Light Rail						Age		Count on June 30th	
Line	Make	Model	Status	Model Year	ULB	2017	2018	2017	2018
Green Line	Kinki Sharyo	Type 7	In Service	1985	31	32	33	86	86
Green Line	Kinki Sharyo	Type 7	In Service	1997	31	20	21	17	17
Green Line	Ansaldo Breda	Type 8	In Service	1998	31	19	20	94	94
Green Line	CAF	Type 9	Planning Phase	2018	31	0	0	0	2
Mattapan	Pullman Standard	PCC	In Service	1945	58	72	73	6	7
								# of units	203 206
								# units ≥ ULB	92 93
								% ≥ ULB	45% 45%

Legend

- FY18 target
- Met or exceeded ULB
- Counted as having met or exceeded ULB

- The MBTA is currently funding a number of Green Line vehicle maintenance and service initiatives to ensure the availability of revenue vehicles for the provision of safe and reliable service.
- The Presidential Conference Committee (PCC) rail cars provide service to the 2.6 mile Mattapan Line. To sustain safe and reliable service, the MBTA will implement a PCC State of Good project. The project will include the replacement of the propulsion units on eight PCC cars with a new solid state unit. The current propulsion units are unreliable and contain asbestos. Additionally, the high voltage system will be replaced with semi-conductors. Also, a new voltage convertor and NiCd 24V standby batteries will be installed. The trucks will be replaced with DC motor driven trucks, resilient wheels, and new braking systems. The RFP Schedule went out to bid in July 2017, Approval of First Article of Inspection is set for September 2018, and the delivery of the first two PCC kits for November 2018. The delivery of the final two PCC kits is set for February 2019, while final completion of the project is expected in May 2019. The budget for this project is eight million dollars. The goal of this program is to obtain 10 years of reliable life from the PCC cars.



MBTA Asset Management Initiatives: FY18 Performance Targets

Rolling Stock

Heavy Rail

Heavy Rail						Age				Count on June		
Line	Make	Model	Status	Model Year	ULB	2017	2018			2017	2018	
Orange Line	Hawker Siddley	OL #12	In Service	1979	31	38	39			120	120	
Orange Line	CRRC	OL #14	Procurement Phase	-	31					0	6	
Red Line	Pullman Standard	RL #1	In Service	1969	31	48	49			70	70	
Red Line	UTDC	RL #2	In Service	1987	31	30	31			58	58	
Red Line	Bombardier	RL #3	In Service	1993	31	24	25			82	82	
Red Line	CRRC	RL #4 (Base Contract)	Procurement Phase	-	31					0	0	
Red Line	CRRC	RL #4 (Option)	Procurement Phase	-	31					0	0	
Blue Line	Siemens	BL #5	In Service	2005	31	12	13			94	94	
										# of units	424	430
										# units ≥ ULB	190	248
										% ≥ ULB	45%	58%

Legend

FY18 target

Legend

- FY18 target
- Met or exceeded ULB
- Counted as having met or exceeded ULB

- The MBTA supports a number of heavy rail car maintenance and service programs to ensure the availability of revenue vehicles for the provision of safe and reliable service.
- A procurement is underway to replace and enlarge the Orange and Red Line fleets. The program entails the delivery of 152 Orange Line vehicles enlarging the current Orange Line fleet by 32 cars. The delivery of Orange Line vehicles will start in 2018 and will be completed by 2022. The three Red Line fleets will be replaced by 252 new rail cars. The delivery of new Red Line vehicles will start in 2019 and will be completed by 2024 (slide #9 depicts the annual count of Orange and Red Line cars through 2027).



MBTA Asset Management Initiatives: FY18 Performance Targets

Rolling Stock

Heavy Rail (beyond 2018)

Heavy Rail						Age												Count on June 30th													
Line	Make	Model	Status	Model Year	ULB	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027				
Orange Line	Hawker Siddley	OL #12	In Service	1979	31	38	39	40	41	42	43						120	120	108	60	24	0									
Orange Line	CRRC	OL #14	Procurement Phase		31			2	3	4	5	6	7	8	9	10	0	6	30	78	126	152	152	152	152	152	152				
Red Line	Pullman Standard	RL #1	In Service	1969	31	48	49	50	51	52	53	54	55	56	57	58	70	70	64	36	0										
Red Line	UTDC	RL #2	In Service	1987	31	30	31	32	33	34	35	36	37	38	39	40	58	58	58	58	36	0									
Red Line	Bombardier	RL #3	In Service	1993	31	24	25	26	27	28	29	30	31	32	33	34	82	82	82	82	82	76	20	0							
Red Line	CRRC	RL #4 (Base Contract)	Procurement Phase		31			2	3	4	5	6	7	8	9	10	0	0	6	38	84	132	132	132	132	132	132				
Red Line	CRRC	RL #4 (Option)	Procurement Phase		31			1	2	3	4	5	6	7	8	9	0	0				6	96	120	120	120	120				
Blue Line	Siemens	BL #5	In Service	2005	31	12	13	14	15	16	17	18	19	20	21	22	94	94	94	94	94	94	94	94	94	94	94				
																		# of units	424	430	442	446	446	460	494	498	498	498	498		
																		# units ≥ ULB	190	248	230	154	60	0	0	0	0	0	0	0	0
																		% ≥ ULB	45%	58%	52%	35%	13%	0%	0%	0%	0%	0%	0%	0%	0%

Legend

Legend

- FY18 target
- Met or exceeded ULB
- Counted as having met or exceeded ULB

A procurement is underway to replace and enlarge the Orange and Red Line fleets. The program entails the delivery of 152 Orange Line vehicles enlarging the current Orange Line fleet by 32 cars. The delivery of Orange Line vehicles will start in 2018 and is expected to be completed by 2022. The three Red Line fleets will be replaced with 252 new rail cars enlarging the current Red Line fleet by 42 cars. The delivery of new Red Line vehicles will start in 2019 and is expected to be completed by 2024.



MBTA Asset Management Initiatives: FY18 Performance Targets

Rolling Stock Commuter Rail Locomotives

Commuter Rail Locomotives						Age		Count on June 30th		
Type	Make	Model	Status	Model Year	ULB	2017	2018	2017	2018	
Locomotive	GMD	GP40MC	In Service	1974	39	43	44	20	18	
Locomotive	EMD	F40PH-2C	In Service	1987	39	30	31	16	12	
Locomotive	EMD/MK	F40PHM-2C	In Service	1991	39	26	27	7	6	
Locomotive	MPI	MP36PH-3C	In Service	2009	39	8	9	2	2	
Locomotive	MPI	HSP-46	In Service	2014	39	3	4	40	40	
Locomotive	EMD	F40PH-2C (UTEX_1,2 & OH)	In Service	1987	39	30	31	1	9	
Locomotive	EMD/MK	F40PHM-2C (UTEX_1,2 & OH)	In Service	1991	39	26	27	1	3	
								# of units	87	90
								# units ≥ ULB	20	18
								% ≥ ULB	23%	20%

Legend

FY18 target

Met or exceeded ULB

Counted as having met or exceeded ULB

Legend

- FY18 target
- Met or exceeded ULB
- Counted as having met or exceeded ULB

- A project to support overhaul activities on up to 7 GP40MC locomotives has a specification developed and is under consideration to be advertised for bids. At the moment, three locomotives are ready to undergo improvements under the program. If this work is performed the useful life for these units will extend to 50 years as the current age is 43 years. The scope of this project encompasses the replacement of main components with remanufactured or new main engines, HEP's, Main Alternators, Traction Motors and requalification or corrective maintenance of other systems.
- The F40PH-2C fleet has units going through two active projects: Keolis UTEX (Unit Exchange) and the MBTA Legacy Locomotive Overhaul. The UTEX program will ensure that these locomotives are able to meet the 39 year useful life benchmark (seven locomotives are included in this program: 1029, 1033, 1036, 1051, 1053, 1058, 1071). The scope for this project is the replacement of main components with remanufactured or new (main engine, HEP, Main Alternator, Traction Motors) and requalification or corrective maintenance to other systems. The MBTA Legacy Locomotive Overhaul program will extend the useful life to 45 years (seven locomotives are included in this program: 1028, 1032, 1050, 1054, 1061, 1063, 1068). The scope for this project is to perform the equivalent of a mid-life overhaul where all major systems are replaced with remanufactured or new units, and all other systems are requalified or addressed by corrective maintenance to add 15 years of useful life with proper maintenance. Also included in the program are upgrades to train control and communications systems.



MBTA Asset Management Initiatives: FY18 Performance Targets

Rolling Stock Commuter Rail Coaches

Commuter Rail Coaches						Age		Count on June 30th	
Type	Make	Model	Status	Model Year	ULB	2017	2018	2017	2018
Blind Trailer Coach	Pullman Standard	BTC-1C	In Service	1978	39	39	40	56	56
Blind Trailer Coach	MBB	BTC-3	In Service	1987	39	30	31	17	17
Control Trailer Coach	MBB	CTC-3	In Service	1987	39	30	31	15	15
Blind Trailer Coach	Bombardier	BTC-1A	In Service	1987	39	30	31	39	39
Blind Trailer Coach	Bombardier	BTC-1B	In Service	1989	39	28	29	53	53
Control Trailer Coach	Bombardier	CTC-1B	In Service	1989	39	28	29	25	25
Blind Trailer Coach	Bombardier	CTC-1B(M)	In Service	1989	39	28	29	24	24
Control Trailer Coach (Bi-level)	Kawasaki	CTC-4	In Service	1990	39	27	28	24	24
Blind Trailer Coach (Bi-level)	Kawasaki	BTC-4	In Service	1990	39	27	28	50	50
Blind Trailer Coach (Bi-level)	Kawasaki	BTC-4(A) - Opt. 1	In Service	1997	39	20	21	17	17
Blind Trailer Coach (Bi-level)	Kawasaki	BTC-4(B) - Opt. 2	In Service	2001	39	16	17	15	15
Blind Trailer Coach (Bi-level)	Kawasaki	BTC-4(C)	In Service	2005	39	12	13	33	33
Control Trailer Coach (Bi-level)	Rotem	CTC-5	In Service	2012	39	5	6	28	28
Blind Trailer Coach (Bi-level)	Rotem	BTC-4(D)	In Service	2012	39	5	6	47	47
						# of units		443	443
						# units ≥ ULB		56	56
						% ≥ ULB		13%	13%

Legend

- FY18 target
- Met or exceeded ULB
- Counted as having met or exceeded ULB

Railroad Operations supports a number of coach maintenance and service initiatives to ensure the availability of revenue vehicles for the provision of safe and reliable service.



MBTA Asset Management Initiatives: FY18 Performance Targets

Rolling Stock The RIDE

RIDE (MBTA-Owned Units)						Age		Count on June 30th	
Procurement Action	Make	Model	Status	Model Year	ULB	2017	2018	2017	2018
Executed	Ford Fusion	Sedan	In Service	2014	8	3	4	139	139
Executed	Ford/Vic	Sedan	In Service	2009	8	8	9	15	0
Executed	Ford/Vic	Sedan	In Service	2013	8	4	5	103	103
Executed	Ford/Pho	Van	In Service	2007	8	10	11	28	0
Executed	Ford/Pho	Van	In Service	2008	8	9	10	42	0
Executed	Ford/Pho	Van	In Service	2009	8	8	9	1	0
Executed	Ford/Sub	Van	In Service	2009	8	8	9	104	90
Executed	Ford/Cutvan	Van	In Service	2014	8	3	4	215	215
Future Procurement	TBD	Van	To enter service after 6/30/17	2018	8				100
								# of units	647
								# units ≥ ULB	190
								% ≥ ULB	29%

Legend

- FY18 target
- Met or exceeded ULB
- Counted as having met or exceeded ULB

Key Assumption used for establishing FY18 Targets

- Keep all fleets the same size
- New vehicles will replace older vehicles



MBTA Asset Management Initiatives: FY18 Performance Targets

Revenue Vehicles

Ferry

Ferry				Age		Count on June 30th		
Vessel Name	Status	Model Year	ULB	2017	2018		2017	2018
Flying Cloud	In Service	1996	42	21	22		1	1
Lightning	In Service	1996	42	21	22		1	1
Champion	Procurement Phase	2017	42	0	1		0	1
Glory	Procurement Phase	2017	42	0	1		0	1
						# of units	2	4
						# units ≥ ULB	0	0
						% ≥ ULB	0%	0%

Legend

- FY18 target
- Met or exceeded ULB
- Counted as having met or exceeded ULB

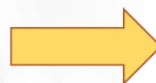
The MBTA has the procurement of two new vessels underway. This procurement will double the size of the MBTA-owned ferry fleet. These two vessels are expected to be delivered before the end of CY2017. The first vessel is anticipated to be completed and in testing by the end of August and delivered in early September. The second vessel is anticipated to be completed by the end of November and tested and delivered to the Authority in early December.



MBTA Asset Management Initiatives: FY18 Performance Targets

Facilities

- Will provide performance targets for:
 - Stations
 - Parking
 - Maintenance and Administrative Buildings
- Data split into two main groups
 - Commuter Rail
 - Transit
- Facilities are scored based on the 5 point FTA Transit Economic Requirements Model (TERM)



Assets: <i>Only those for which agency has direct capital responsibility</i>	Performance Measure
Equipment: Non-revenue support-service and maintenance vehicles	Percentage of non-revenue vehicles met or exceeded Useful Life Benchmark
Rolling Stock: Revenue vehicles by mode	Percentage of revenue vehicles met or exceeded Useful Life Benchmark
Infrastructure: Only rail fixed-guideway, track, signals and systems	Percentage of track segments with performance restrictions
Facilities: Maintenance and administrative facilities; and passenger stations (buildings) and parking facilities	Percentage of assets with condition rating below 3.0 on FTA TERM Scale

Note: See TERM scale under Appendix 2



MBTA Asset Management Initiatives: FY18 Performance Targets

Facilities Transit

The FTA definition of a facility applies to buildings or structures contributing to the provision of public transportation services, including stations, parking structures and lots, maintenance and administrative facilities, and power unit substations. The FTA guide excludes bus shelters and stops.

The condition data used in developing performance targets included historical, recent consultant assessments of facilities, as well as expert advice from maintenance staff. The MBTA's Department of Asset Management is in the process of establishing comprehensive condition assessment standards for all type of facilities which will be rolled out at a system-wide level. The condition assessment criteria to be used will be based on existing national and international industry standards and FTA-stipulated assessment methodologies.

When condition assessment updates for all facilities are completed, these targets may be adjusted. Future targets may also be adjusted based on improved methods of determining asset criticality (as it relates to the overall facility rating) and changes in facility usage, maintenance activities, capital plans and other economic factors.

		Baseline 6/30/2017	Target 6/30/2018
Stations			
Bus			
	# of units	3	3
	# < 3.0	1	1
	% < 3.0	33%	33%
Bus Rapid Transit			
	# of units	3	3
	# < 3.0	2	2
	% < 3.0	67%	67%
Ferry			
	# of units	2	2
	# < 3.0	1	1
	% < 3.0	50%	50%
Subway			
	# of units	128	128
	# < 3.0	80	80
	% < 3.0	63%	63%
Systemwide			
	# of units	1	1
	# < 3.0	1	1
	% < 3.0	100%	100%

		Baseline 6/30/2017	Target 6/30/2018
Parking			
Bus			
	# of units	1	1
	# < 3.0	1	1
	% < 3.0	100%	100%
Subway			
	# of units	24	24
	# < 3.0	21	21
	% < 3.0	88%	88%
Facilities			
Bus			
	# of units	29	29
	# < 3.0	9	9
	% < 3.0	31%	31%
Subway			
	# of units	18	18
	# < 3.0	6	6
	% < 3.0	33%	33%
Subway - Power Substations			
	# of units	36	36
	# < 3.0	23	23
	% < 3.0	64%	64%
Systemwide			
	# of units	29	29
	# < 3.0	20	20
	% < 3.0	69%	69%



MBTA Asset Management Initiatives: FY18 Performance Targets

Facilities

Commuter Rail

The FTA definition of a facility applies to buildings or structures contributing to the provision of public transportation services, including stations, parking structures and lots, maintenance and administrative facilities, and power unit substations. The FTA guide excludes bus shelters and stops.

The condition data used in developing performance targets included historical, recent consultant assessments of facilities, as well as expert advice from maintenance staff. The MBTA's Department of Asset Management is in the process of establishing comprehensive condition assessment standards for all type of facilities which will be rolled out at a system-wide level. The condition assessment criteria to be used will be based on existing national and international industry standards and FTA-stipulated assessment methodologies.

When condition assessment updates for all facilities are completed, these targets may be adjusted. Future targets may also be adjusted based on improved methods of determining asset criticality (as it relates to the overall facility rating) and changes in facility usage, maintenance activities, capital plans and other economic factors.

		Baseline	Target
		6/30/2017	6/30/2018
Commuter Rail			
Stations			
	# of units	140	140
	# < 3.0	65	65
	% < 3.0	46%	46%
Parking			
	# of units	74	74
	# < 3.0	42	42
	% < 3.0	57%	57%
Facilities			
	# of units	29	29
	# < 3.0	7	7
	% < 3.0	24%	24%



MBTA Asset Management Initiatives: FY18 Performance Targets

Infrastructure

- FY2017 speed restriction information for the following modes:

- Heavy Rail
- Light Rail
- Commuter Rail

Commuter rail fixed guideway performance information for FY17 has been collected but is not included in this document as it is undergoing a validation process at the moment. Commuter rail FY18 targets are expected to be completed by October 30, 2017. The targets will be developed based on an evaluation on the condition of the assets, planned maintenance activities, and funding available under the current capital investment program.



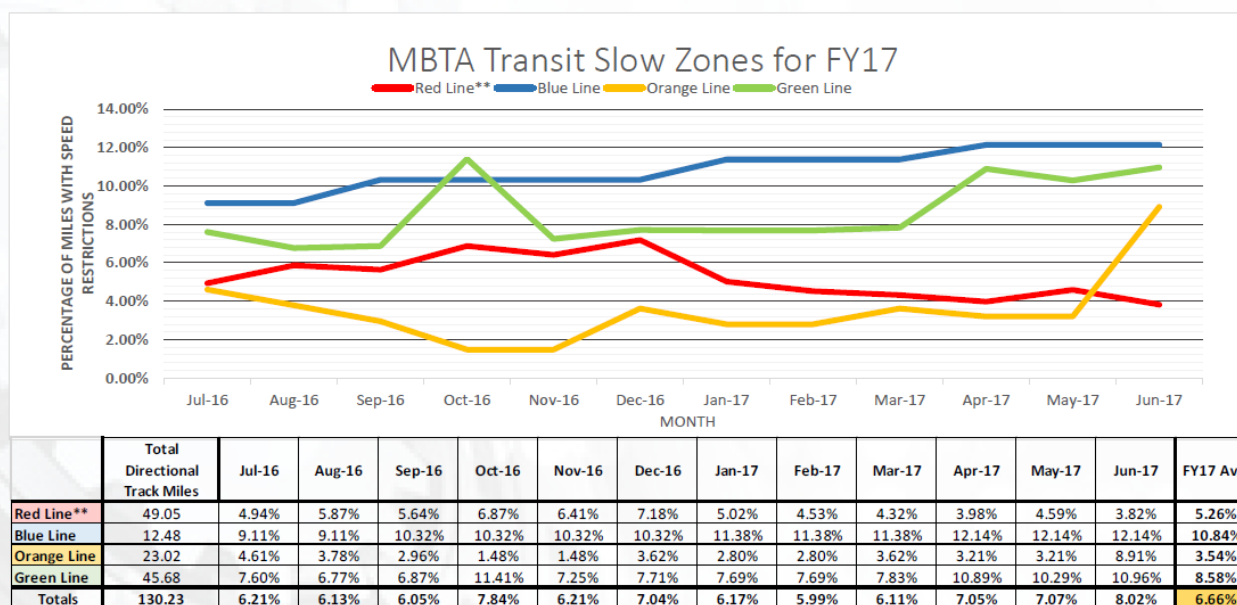
Assets: <i>Only those for which agency has direct capital responsibility</i>	Performance Measure
Equipment: Non-revenue support-service and maintenance vehicles	Percentage of non-revenue vehicles met or exceeded Useful Life Benchmark
Rolling Stock: Revenue vehicles by mode	Percentage of revenue vehicles met or exceeded Useful Life Benchmark
Infrastructure: Only rail fixed-guideway, track, signals and systems	Percentage of track segments with performance restrictions
Facilities: Maintenance and administrative facilities; and passenger stations (buildings) and parking facilities	Percentage of assets with condition rating below 3.0 on FTA TERM Scale



MBTA Asset Management Initiatives: FY18 Performance Targets

Infrastructure

Fixed Guideway Speed Restrictions – Heavy & Light Rail



See table with FY17 miles under Appendix 3

The FTA recommends to use speed restriction data corresponding to the conditions that exist as of 9:00 a.m. local time on the first Wednesday of each month. Considering the availability of data, the MBTA speed restriction information in the above graph and table corresponds to whole year statistics, not a sample. Also, the MBTA data submitted for fixed guideway infrastructure does not include non-revenue track such as yards, turnaround, storage tracks, etc. The process by which speed restrictions are evaluated has been further refined within the last calendar year, hence the uptake noted in the graph for speed restrictions. In addition, work performed outside the control of the MBTA and affecting service (e.g., the Boston University, Commercial Avenue and Longfellow bridge replacement work) has also been included in the speed restriction calculations for both the Green and Red Lines respectively as the guidance issued does not state to exempt these circumstances.

**It includes Mattapan Line service



MBTA Asset Management Initiatives: FY18 Performance Targets

Infrastructure

Fixed Guideway Speed Restrictions – Light Rail/Heavy Rail/Commuter Rail

Mode of Guideway	Total Directional Track Miles	FY18 TARGET % with Performance Restrictions
Light Rail	45.68	8.58%
Heavy Rail**	84.55	5.62%
Commuter Rail	663.84	0.35%

** It includes Mattapan High Speed Line

MBTA data submitted for rail fixed guideway infrastructure does not include non-revenue track such as yards, turnaround, storage tracks, etc. The data is based upon "Directional Route Miles" which is representative of the miles managed and maintained by the MBTA with respect to each direction of travel. For example, the Orange Line mileage is based on both north and south bound tracks. The reporting of this measure is intended to help standardize reporting of slow zones (commonly referred to as "speed restrictions") across rail operating transit per the Federal Transit Administration national requirements. The MBTA fixed guideway system is comprised of two main networks: Transit (i.e., heavy and light rail) totaling 130.23 directional track miles, and Commuter Rail totaling 664 directional track miles.

In accordance with the FTA guidance with regards to the Performance Restriction Calculations, this measure should be calculated as a snapshot in time, as of 9:00 a.m. on the first Wednesday of each month and limited to speed restrictions which are localized to a specific track segment (i.e., excluding blanket restrictions based on environmental factors such as heat or snow). Considering the availability of data, the MBTA speed restriction targets for heavy and light rail were developed with whole year statistics, not the suggested sample. The targets represent the annual average over the 12 month reporting period.

Target setting for FY18 and subsequent years was and will be based on historical data along with the enhanced track quality inspection processes, on-going maintenance initiatives and planned capital investment in track renewals and other assets that might affect speed restrictions (e.g., signals, bridge work, etc.) The MBTA's Department of Asset Management is in the process of establishing comprehensive condition assessments standards for track, signals, communication and power systems which will further refine condition criteria and assessment methodologies.



MBTA Asset Management Initiatives: FY18 Performance Targets

Non-Revenue Vehicles

- Automobile
- Minibus
- Other Rubber Tire Vehicles
- Sports Utility Vehicles
- Steel Wheel Vehicles
- Vans

This document contains only FY17 baseline information for non-revenue vehicles. The FY18 targets are being developed pending the completion of a fleet plan which will establish replacement schedules based on funding set aside for non-revenue vehicles.

Note: See Rolling Stock ULB values under Appendix 1

Assets: <i>Only those for which agency has direct capital responsibility</i>	Performance Measure
Equipment: Non-revenue support-service and maintenance vehicles	Percentage of non-revenue vehicles met or exceeded Useful Life Benchmark
Rolling Stock: Revenue vehicles by mode	Percentage of revenue vehicles met or exceeded Useful Life Benchmark
Infrastructure: Only rail fixed-guideway, track, signals and systems	Percentage of track segments with performance restrictions
Facilities: Maintenance and administrative facilities; and passenger stations (buildings) and parking facilities	Percentage of assets with condition rating below 3.0 on FTA TERM Scale

Useful Life Benchmark

The expected lifecycle of a capital asset for a particular Transit Provider's operating environment, or the acceptable period of use in service for a particular Transit Provider's operating environment



MBTA Asset Management Initiatives: FY18 Performance Targets

Equipment

Non-Revenue Vehicles (Transit)

FY18 Target

By keeping the fleets the same size and replacing 12 older vehicles, 21 additional vehicles will reach their ULB increasing the number of non-revenue vehicles that meet or exceed their ULB from 383 to 404. This will increase the percent of vehicles that meet or exceed their ULB by 3% (from 47% to 50%)

		Baseline 6/30/2017	FY18 Target 6/30/2018
Non-Revenue Vehicles (Transit)			
Automobile (ULB = 8 years)			
	# of units	123	123
	# of units ≥ ULB	77	85
	% ≥ ULB	63%	69%
Minibus (ULB = 10 years)			
	# of units	3	3
	# of units ≥ ULB	3	3
	% ≥ ULB	100%	100%
Other Rubber Tire Vehicle (ULB = 14 years)			
	# of units	412	412
	# of units ≥ ULB	189	201
	% ≥ ULB	46%	49%
Sports Utility Vehicle (ULB = 8 years)			
	# of units	148	148
	# of units ≥ ULB	58	57
	% ≥ ULB	39%	39%
Steel Wheel Vehicle (ULB = 25 years)			
	# of units	32	32
	# of units ≥ ULB	7	7
	% ≥ ULB	22%	22%
Van (ULB = 8 years)			
	# of units	93	93
	# of units ≥ ULB	49	51
	% ≥ ULB	53%	55%
Consolidated NRV (Transit)			
	# of units	811	811
	# of units ≥ ULB	383	404
	% ≥ ULB	47%	50%



MBTA Asset Management Initiatives: FY18 Performance Targets

Equipment

Non-Revenue Vehicles (Commuter Rail)

FY18 Target

With the acquisition of four new vehicles and the retirement of two older units, 17 additional vehicles will reach their ULB increasing the number of non-revenue vehicles that meet or exceed their ULB from 256 to 273. This will increase the percent of vehicles that meet or exceed their ULB by 2% (from 25% to 27%)

	Baseline 6/30/2017	FY18 Target 6/30/2018
Non-Revenue Vehicles (Commuter Rail)		
Automobile (ULB = 8 years)		
# of units	1	1
# of units ≥ ULB	0	0
% ≥ ULB	0%	0%
Other Rubber Tire Vehicle (ULB = 14 years)		
# of units	638	640
# of units ≥ ULB	158	172
% ≥ ULB	25%	27%
Sports Utility Vehicle (ULB = 8 years)		
# of units	92	92
# of units ≥ ULB	13	13
% ≥ ULB	14%	14%
Steel Wheel Vehicle (ULB = 25 years)		
# of units	273	273
# of units ≥ ULB	85	86
% ≥ ULB	31%	32%
Van (ULB = 8 years)		
# of units	7	7
# of units ≥ ULB	0	2
% ≥ ULB	0%	29%
Consolidated NRV (Commuter Rail)		
# of units	1011	1013
# of units ≥ ULB	256	273
% ≥ ULB	25%	27%



MBTA Asset Management Initiatives: FY18 Performance Targets

FTA TAM Requirements

Next Steps

October 2017

- ☐ Complete the FY18 Target Setting Exercise
- ☐ New Asset Inventory Module for National Transit Database (NTD) Submission (optional)

October 2018

- ☐ Completion of TAM Plan
- ☐ Asset Inventory and Condition Reporting to NTD
- ☐ Performance Targets for FY19

October 2019

- ☐ Asset Inventory and Condition Reporting to NTD
- ☐ Narrative Report to explain
 - Change in condition
 - Progress towards targets
- ☐ Performance Targets for FY20



MBTA Asset Management Initiatives: FY18 Performance Targets

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**Massachusetts Bay
Transportation Authority**



MBTA Asset Management Initiatives: FY18 Performance Targets

Appendix 1 Useful Life Benchmark (ULB)

FTA

FEDERAL TRANSIT ADMINISTRATION

Default Useful Life Benchmark (ULB) Cheat Sheet

Source: 2017 Asset Inventory Module Reporting Manual, Page 53

Transit Agencies will report the age of all vehicles to the National Transit Database. FTA will track the performance of revenue vehicles (Rolling Stock) and service vehicles (Equipment), by asset class, by calculating the percentage of vehicles that have met or exceeded the useful life benchmark (ULB).

FTA has set a default ULB as the expected service years for each vehicle class in the table below. ULB is the average age-based equivalent of a 2.5 rating on the FTA Transit Economic Requirements Model (TERM) scale. Transit agencies can adjust their Useful Life Benchmarks with approval from FTA.

Vehicle Type	Default ULB (in years)
AB Articulated bus	14
AG Automated guideway vehicle	31
AO Automobile	8
BR Over-the-road bus	14
BU Bus	14
CC Cable car	112
CU Cutaway bus	10
DB Double decked bus	14
FB Ferryboat	42
HR Heavy rail passenger car	31
IP Inclined plane vehicle	56
LR Light rail vehicle	31
MB Minibus	10
MO Monorail vehicle	31
MV Minivan	8
Other rubber tire vehicles	14
RL Commuter rail locomotive	39
RP Commuter rail passenger coach	39
RS Commuter rail self-propelled passenger car	39
RT Rubber-tired vintage trolley	14
SB School bus	14
Steel wheel vehicles	25
SR Streetcar	31
SV Sport utility vehicle	8
TB Trolleybus	13
TR Aerial tramway	12
VN Van	8
VT Vintage trolley	58



MBTA Asset Management Initiatives: FY18 Performance Targets

Appendix 2

Facilities Scoring (Stations, Parking and Maintenance Buildings)

Scoring is based on the FTA Transit Economic Requirements Model (TERM) Scale


An asset is in **SGR** if it has a rating over 3 on the TERM scale.

Rating	Description	Condition
5	Excellent	New asset; no visible defects
4	Good	Some slightly defective/deteriorated component(s)
3	Adequate	Some moderately defective/deteriorated component(s)
2	Marginal	Increasing # of defective/deteriorated component(s) & maintenance needs
1	Poor	In need of immediate repair or replacement; may have critically damaged component(s)





MBTA Asset Management Initiatives: FY18 Performance Targets



MBTA PERFORMANCE BASELINES AND TARGETS FOR FY2018
August 2017

As required under 625.45 (e) the MBTA is making available these targets to the Boston Metropolitan Planning Organization (MPO). On June 30, 2017, a provisional MBTA Target Information package was delivered to MPO staff pending the completion of a data gathering and

Table 2 - Non-Revenue Vehicles (Commuter Rail)

Vehicle Class	ULB (2016)	# of Units (2016/2017)	FY17 BASELINE % at or Exceeding ULB

The MBTA maintains vehicle databases that track vehicle acquisition and replacement activities. To develop performance targets for each asset class under the ULB will depend on the overarching

FY2018 Performance Targets for Facilities

As stated under the TAM rule (subsection 625.43B), the performance measure for facilities is the percentage of facilities within an asset class, rated below condition 3 on the TERM scale.

TERM scale means the five (5) category rating system used in the Federal Transit Administration's Transit Economic Requirements Model (TERM) to describe the condition of an asset: 5.0—Excellent, 4.0—Good, 3.0—Adequate, 2.0—Marginal, and 1.0—Poor.

Table 5 - Facilities



Type of Facilities	Number of Facilities	FY18 TARGET % with Condition Rating below 3.0
Stations and Parking	376	57%
Maintenance and Administrative Building	341	46%

MBTA maintains condition data on its facilities. At the end of FY17 a review and update of the condition assessment values took place in order to help establish FY18 targets. Future target setting exercises will be influenced by subsequent condition assessments, maintenance activities scheduled and capital funding plans.

The MBTA has embarked on a process of continuous improvement for updating its asset inventory and tracking asset condition and performance. As condition assessment is a continuum when updated data is incorporated, these targets might be adjusted. Furthermore, future targets might need adjustments based on improved methods of determining condition and performance, changes in operational factors such as asset usage and maintenance activities, as well as funding availability.

As the MBTA's accountable executive, I have approved the targets contained in this document. MBTA staff is focused on working with all units within the organization to gather all the elements necessary for the establishment of targets in the areas with only a baseline. For additional information regarding the target setting exercise or future actions related to the TAM Rule please contact Sayen Patel, Director of Asset Management, at sapat@mbta.com or Victor Rivas, Deputy Director of Capital Programs Reporting, Metrics and Strategic Initiatives, at vrivas@mbta.com

Accountable Executive

Steve Pflaak
General Manager

Date: 8/9/17

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